

CLAIMS

What is claimed is:

1. A method for making a flip chip ball grid
5 array package comprising the following steps:
reducing the thickness of a die from a wafer
thickness to a selected thickness to make a thin die for
reducing mismatch of a coefficient of thermal expansion of
the thin die to that of a substrate;
10 forming a plurality of thin film layers on the thin
die wherein each of the thin film layers has a coefficient
of thermal expansion that is greater than that of the thin
die and is less than that of the substrate; and
forming a plurality of wafer bumps on the thin die to
15 make electrical contact between the thin die and the
substrate.
2. The method of Claim 1 wherein the die
thickness is less than 500 microns.
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3. The method of Claim 1 wherein at least one
of the plurality of thin film layers comprises an
adhesive.
- 25 4. The method of Claim 1 wherein the plurality
of thin film layers comprises a first, a second, and a
third thin film layer having successively graduated
coefficients of thermal expansion from about 7-10 parts
per million per degree Kelvin for the first thin film
30 layer, 10-14 parts per million per degree Kelvin for the

second thin film layer, and 15-19 parts per million per degree Kelvin for the third thin film layer, respectively.

5 5. The method of Claim 1 further including the step of underfilling between the thin die and the substrate.

6. A method for making a flip chip ball grid array package comprising the following steps:

10 reducing the thickness of a die from a wafer thickness to a selected thickness to make a thin die for reducing mismatch of a coefficient of thermal expansion of the thin die to that of a substrate;

 forming a plurality of thin film layers on the thin die wherein each of the thin film layers has a coefficient of thermal expansion that is greater than that of the thin die and is less than that of the substrate; and

15 bonding the thin die to the substrate to make electrical contact between the plurality of wafer bumps on the thin die and a plurality of contact pads on the substrate.

25 7. The method of Claim 6 wherein the die thickness is less than 500 microns.

8. The method of Claim 6 wherein at least one of the plurality of thin film layers comprises an adhesive.

30 9. The method of Claim 6 wherein the plurality of thin film layers comprises a first, a second, and a

third thin film layer having successively graduated coefficients of thermal expansion from about 7-10 parts per million per degree Kelvin for the first thin film layer, 10-14 parts per million per degree Kelvin for the
5 second thin film layer, and 15-19 parts per million per degree Kelvin for the third thin film layer, respectively.